AMENDMENTS TO THE CLAIMS:

This listing of claims will replace all prior versions, and listings, of claims in the application:

LISTING OF CLAIMS:

1. (Cancel)

2. (Cancel)

3. (Currently Amended) The ~~discharge apparatus~~ plasma processing method according to claim 23 [[1]], wherein ~~said straight conductor~~ at least one of the first and second straight conductors has a diameter of 10mm or less.

4. (Currently Amended) The ~~discharge apparatus~~ plasma processing method according to claim 24 [[2]], wherein ~~said straight conductor~~ at least one of the first and second straight conductors has a diameter of 10mm or less.

5. (Currently Amended) The ~~discharge apparatus~~ plasma processing method according to claim 3, wherein ~~said straight conductor~~ at least one of the first and second straight conductors has a diameter of 1mm or more.

6. (Currently Amended) The ~~discharge apparatus~~ plasma processing method according to claim 4, wherein ~~said straight conductor~~ at least one of the first and second straight conductors has a diameter of 1mm or more.

7. (Currently Amended) The ~~discharge apparatus~~ plasma processing method according to claim 23 [[1]], wherein the diameter of ~~said straight conductor~~ at least one of the first and second straight conductors is varied in the longitudinal direction.

8. (Currently Amended) The ~~discharge apparatus~~ plasma processing method according to claim 24 [[3]], wherein the diameter of ~~said straight conductor~~ at least one of the first and second straight conductors is varied in the longitudinal direction.

9. (Currently Amended) The ~~discharge apparatus~~ plasma processing method according to claim 7, wherein ~~said straight conductor~~ at least one of the first and second straight conductors has a diameter of 10mm or less partially or entirely.

10. (Currently Amended) The ~~discharge apparatus~~ plasma processing method according to claim 8, wherein ~~said straight conductor~~ at least one of the first and second straight conductors has a diameter of 10mm or less partially or entirely.

11. (Currently Amended) The ~~discharge apparatus~~ plasma processing method according to claim 23 [[1]], wherein ~~said straight conductor~~ at least one of the first and second straight conductors is covered partially or entirely with a dielectric.

12. (Currently Amended) The ~~discharge apparatus~~ plasma processing method according to claim 24 [[2]], wherein ~~said straight conductor~~ at least one of the first and second straight conductors is covered partially or entirely with a dielectric.

13. (Currently Amended) The ~~discharge apparatus~~ plasma processing method according to claim 11, wherein the thickness of said dielectric is varied in the longitudinal direction of ~~said straight conductor~~ at least one of the first and second straight conductors.

14. (Currently Amended) The ~~discharge apparatus~~ plasma processing method according to claim 12, wherein the thickness of said dielectric is varied in the longitudinal direction of ~~said straight conductor~~ at least one of the first and second straight conductors.

15. (Currently Amended) The ~~discharge apparatus~~ plasma processing method according to claim 13, wherein the edge of said dielectric is tapered in the cross section.

16. (Currently Amended) The ~~discharge apparatus~~ plasma processing method according to claim 14, wherein the edge of said dielectric is tapered in the cross section.

17. (Currently Amended) The ~~discharge apparatus~~ plasma processing method according to claim 11, wherein said dielectric is formed spirally about the longitudinal direction of ~~said straight conductor~~ at least one of the first and second straight conductors.

18. (Currently Amended) The ~~discharge apparatus~~ plasma processing method according to claim 12, wherein said dielectric is formed spirally about the longitudinal direction of ~~said straight conductor~~ at least one of the first and second straight conductors.

19. (Currently Amended) The ~~discharge apparatus~~ plasma processing method according to claim 23 [[1]], wherein substrate bodies are placed on a second and a third plane which is located at respective sides of said first plane to simultaneously process both the substrate bodies placed on the second and the third plane.

20. (Currently Amended) The ~~discharge apparatus~~ plasma processing method according to claim 24 [[2]], wherein substrate bodies are placed on a second and a third plane which is located at respective sides of said first plane to simultaneously process both the substrate bodies placed on the second and the third plane.

21. (Currently Amended) The ~~discharge apparatus~~ plasma processing method according to claim 19, wherein a plurality of said array antennas are arranged in one vacuum chamber.

22. (Currently Amended) The ~~discharge apparatus~~ plasma processing method according to claim 20, wherein a plurality of said array antennas are arranged in one vacuum chamber.

23. (Original) A plasma processing method, comprising;

arranging a plurality of antenna elements, each having a configuration in which a first and a second straight conductor with the same length are placed in parallel and are electrically connected each other at the one end to have a grounded end at the other end of the first straight conductor and a power feeding end of alternating current power at the other end of the second straight conductor to form an array antenna in such a way that the first and the second conductor are alternately placed in parallel at regular intervals on a first plane in a vacuum, and

feeding the alternating current power to said array antenna to generate a discharge plasma in the vacuum,

wherein the alternating current electric powers with the same excitation frequency and the phase shift of 180 degrees between adjacent power feeding ends are fed to said power feeding ends simultaneously, the excitation frequency of the alternating current power is 10 MHz – 2 GHz, and the length of said conductors is set so that the measured ratio of reflected wave to incident wave is 0.1 or less at the power feeding end.

24. (Original) A plasma processing method, comprising;

arranging a plurality of antenna elements, each having a configuration in which a first and a second straight conductor with the same length are placed in parallel and are electrically connected each other at the one end to have a grounded end at the other end of the first straight conductor and a power feeding end of alternating current power at the other end of the second straight conductor to form an array antenna in such a way that the first and the second conductors are alternately placed in parallel at regular intervals on a first plane in a vacuum, and

feeding the alternating current power to said array antenna to generate a discharge plasma in the vacuum,

wherein the alternating current electric powers of the same excitation frequency and the phase shift of 180 degrees between adjacent power feeding ends are fed to said power feeding ends simultaneously, the excitation frequency of the alternating current power is 10 MHz - 400 MHz, and the length La of said straight conductors is set to hold the inequality;

$0.5(1/\alpha) < La < 10\ (1/\alpha)$

in which a attenuation coefficient α(1/m) is given by:

$$\alpha = -\mathrm{Im}\left[6.28f\sqrt{\frac{1.26\times10^{-6}\ln\left(\frac{\delta}{3\times10^{-3}}\right)}{9.57\times10^{10}+\frac{1.13\times10^{11}}{\kappa_p}\ln\left(\frac{\delta}{7\times10^{-3}}\right)}}\right]$$

using a dielectric constant κ_p of plasma as a function of an excitation frequency f and a discharge pressure p (Pa), expressed by:

$$\kappa_p = 1 - \frac{\frac{1.61 \times 10^{17}}{f^2}}{1 - j1.54\left(\frac{p}{f}\right) \times 10^7}$$

and a skin depth δ (m) of the electromagnetic field penetrating into the plasma, expressed by:

$$\delta = -2.10 f \times 10^{-8} \operatorname{Im}\left[\sqrt{\kappa_p}\right]$$

25. (Cancel)

26. (Cancel)